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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE

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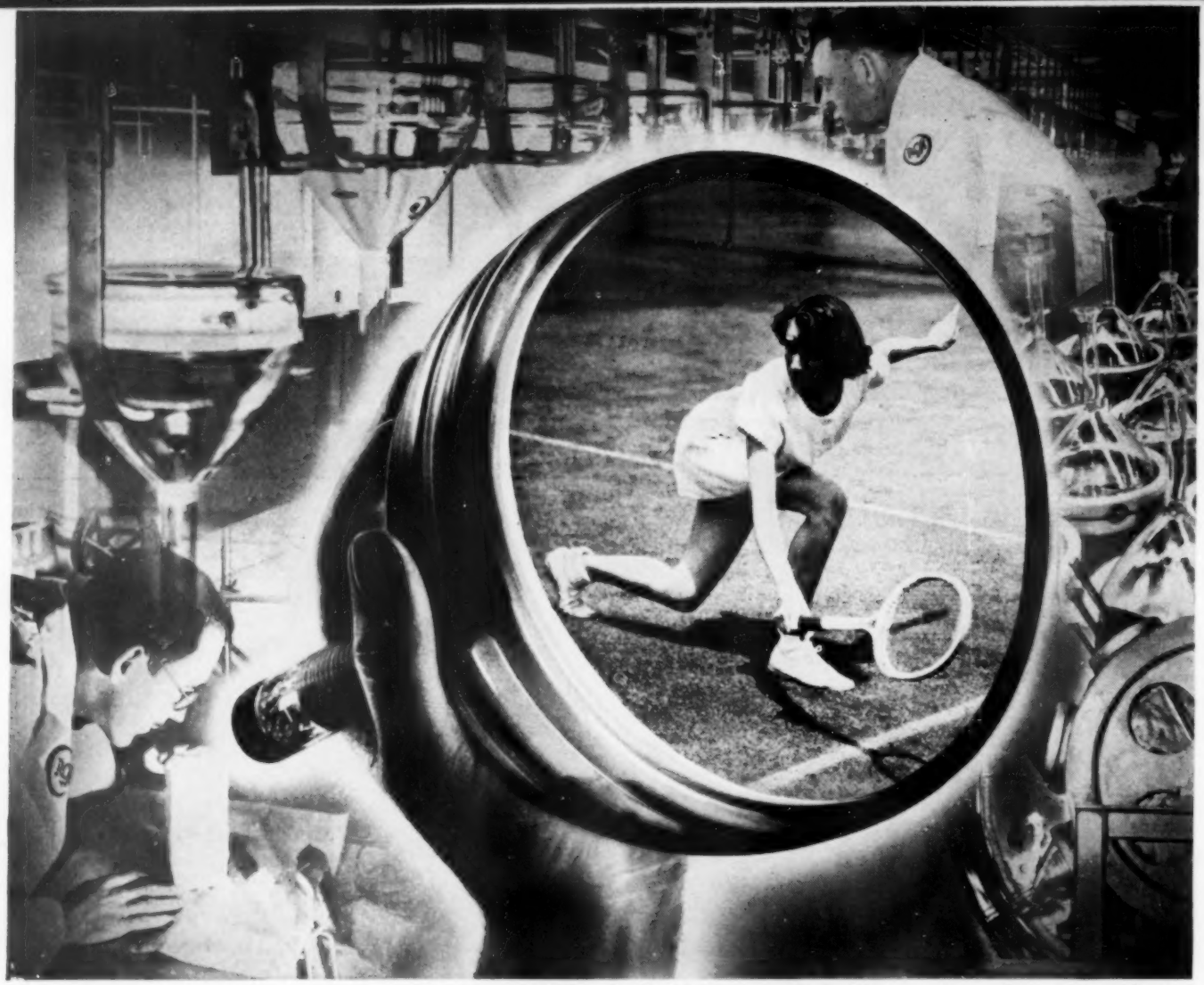
A SCIENCE SERVICE PUBLICATION



Machines in RCA's Lancaster Tube Plant are designed for mass production of Kinescopes—television picture tubes—at lowest possible cost.

Behind the magic of a Television Tube

Every morning, 14 tons of glass "bulbs" go down to the production lines at the RCA Tube Plant in Lancaster, Pa.

By evening, the bulbs are television picture tubes, their luminescent faces ready to glow—in television homes everywhere—with news, sports, entertainment, education, politics.

Born of glass, metals, chemicals, the picture tube comes to life through flame and heat. Its face is coated with fluorescent material—forming a screen on which an electron gun "paints" moving images.

Each step is so delicately handled that, although RCA craftsmen are working with fragile glass, breakage is less than 1%.

Water, twice-distilled, floats the fluorescent material into place on the face of the tube, where it clings by molecular attraction—as a uniform and perfect coating.

Every phase of manufacture conforms to scientific specifications established by RCA Laboratories. Result: Television tubes of highest perfection—assuring sharp, clear pictures on the screens of RCA Victor home television receivers.

• • •

When in Radio City, New York, be sure to see the radio, television and electronic wonders at RCA Exhibition Hall, 36 West 49th Street. Free admission. Radio Corporation of America, RCA Building, Radio City, New York 20.

RCA **RADIO CORPORATION of AMERICA**

MEDICINE

Polio Checked by Drug

This chemical, belonging to the sulfa drug family, may herald the conquest of virus diseases among which is the common cold.

➤ THE chemical conquest of virus diseases, which range from the common cold to encephalitis, or sleeping sickness as it is called, is heralded by the discovery of a chemical that stops infantile paralysis.

A number of polio victims are said to be walking around today, thanks to the chemical, called phenosulfazole, with tradename of Darvisul, instead of being paralyzed and crippled for life. The drug has been given to more than 70 patients already this season and several hundred will probably get it within the next two months.

The chemical is a modified and very peculiar and interesting sulfa drug. It was developed by Dr. Murray Sanders of Columbia University College of Physicians and Surgeons and eight chemists of Lederle Laboratories.

First trials of the drug started on patients in Texas this summer, after extensive studies with mice and monkeys showed what it could do and that it was non-toxic and therefore safe to use.

Just how many cases have been aided by the drug in the Texas trials will need to be determined by exhaustive tests upon the patients who seem to have had beneficial effects from the drug.

There is plenty of the drug. It is being supplied to physicians provided they can give reasonable assurance that they can accurately study the patients. This is necessary with any new drug while proper dosages are being worked out. Dr. Sanders feels now that some patients should be treated more vigorously than others. But this type of knowledge could not be gained without the trials now under way.

Besides the problem of dosage, there is another reason for being careful that the drug goes only to responsible persons. This is that otherwise many patients who did not have polio might get it, instead of getting some medicine they did need.

Dr. Sanders and Lederle had hoped to have news of the drug reach physicians through regular scientific channels before it became public knowledge but this was prevented by premature reporting. His work was not done under a grant from the National Foundation for Infantile Paralysis, and was not reported to the recent International Poliomyelitis Conference.

There does seem to be a good chance that due to the public attention focused upon this new chemical agent, even prior to scientific publication, more doctors will join those now evaluating the drug clinically.

Formal statements about the results will continue to be withheld until later. The drug is reported to be in ample supply and there is a polio epidemic. For these reasons, more progress in testing the new treatment will be made in the coming weeks than otherwise would be the case.

Meanwhile with an infantile paralysis epidemic in Texas and North Carolina and possibly spreading elsewhere, facts about this important advance have been obtained and reported by Science Service.

There have been some failures with the drug. If motor nerve cells have been destroyed, the drug cannot be expected to restore them. But it can stop the progress of the infection to more nerve cells and can prevent deaths from polio.

The unique feature of the drug, that it can stop a virus disease, gives hope that this or other drugs can be made to stop other virus diseases.

Full details about Darvisul are now scheduled for reporting at a New York Academy of Sciences conference on Aug. 23.

Science News Letter, July 31, 1948

METEOROLOGY

Prevent Spread of Gases

➤ TWO WEATHER observation towers to provide information which will guard against the spread of radioactive gas are nearing completion at Brookhaven National Laboratory in Upton, N. Y.

The purpose of these towers is to permit study of wind currents so that radioactive gas can be prevented from spreading from the nuclear reactor or chain reacting pile which will be finished this fall.

The nuclear reactor will be cooled by air. Contaminated air will be conducted away from the pile by large fans and sent through an air duct and up a 300-foot stack on a nearby hill. This air will contain minute quantities of radioactive argon gas. Study of wind velocity and direction, and atmospheric pressure from the towers during operation of the pile will make it possible to control the pile so that the radioactive gas will be sent up into the upper atmosphere where it can do no harm and not settle near the ground. If weather conditions are unfavorable the

LEDERLE LABORATORIES—Two new drugs have recently come from here—the anti-polio chemical, phenosulfazole, which may prove effective against other virus diseases, and the antibiotic, aureomycin, which may check diseases not touched by either penicillin or streptomycin. (See p. 69). This is an aerial view of the laboratories in Pearl River, N. Y.

nuclear reactor will be stopped.

The design of the observation towers was supervised by the Brookhaven Meteorology Group, headed by Norman R. Beers. Working with the group is a special station of the U. S. Weather Bureau, headed by Raymond C. Wanta.

The taller of the two towers, which is to be 420 feet high or as tall as a 35- or 40-story building, will be the tallest structure on Long Island, laboratory officials believe. It is to be completed soon. The second tower, 160 feet high, is already complete. There will be platforms, five on the small tower and eight on the large one, where observers can take readings from weather-recording instruments.

Weather instruments on the towers will be mounted on beams which can be swung away from the towers and then pulled in for observation. In addition, weather observations will be recorded electrically on an instrument panel in a building 900 feet away from the towers. The building has to be this far away from the towers so that eddies created by winds passing over the building will not disturb observations made by instruments on the towers. Two electrified cables between the towers will carry instruments to record temperature and wind differences between them.

Another feature of the tall weather tower will be a smoke stack which will carry only smoke created for the purpose of studying wind and weather. This is a 20-inch steel pipe running the height of the stack, and it will give off smoke produced by a surplus Army M-1 smoke generator, similar to those used in spreading smoke screens.

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Science Service Radio

➤ LISTEN in to a discussion on thunder and lightning flying on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EDST Saturday, Aug. 7. Maj. Gen. H. M. McClelland of the Military Air Transport Service, Gravelly Point, Va., as the guest of Mr. Watson Davis, director of Science Service, will tell the hazards of flying in thunderstorms and of the project the Air Force and Weather Bureau were working on together.

Science News Letter, July 31, 1948

Letters To The Editor

Up-To-Date Matter

My appreciation for "Laws of Matter" (SNL, June 19). Many of us needed this to bring us up-to-date.—Ralph C. Max, D.D.S., Hartville, Mo. *We're planning to do this for other fields, thanks.*

Gained Inspiration

I have read "Nature Ramblings" pretty regularly for about five years and have enjoyed them all, but the one on "Force-of-Habit Farming" (SNL, July 10) really stirs me up to want to do something about it.

I am not a farmer. I am a retired physician with gardening as a hobby, but I have a hunch that you have given me the idea I have been needing.—Walter Rittenhouse, San Diego, Calif.

We are glad that it stirred you to thoughts of trying to make your San Diego County hillsides pay for their keep. If they can be induced to yield something good for food, either directly or via the medium of some food animal, there surely will be hope for more fertile, better watered hillsides elsewhere!

Why The Patient?

I can't refrain from commenting on the article entitled "X-Ray Photos by Wire" (SNL, July 3). Would it have taken a master mind to think of transporting the pictures in question to the nearby large city instead of the patient? I assume that the small town hospital had at least a telephone so that the large city radiologist could have phoned back his findings on receipt of the pictures.—Joseph G. Landauer, Hollywood, Fla.

The method was developed to do just that—transport the pictures rather than the patient, and in a minimum of time.

Question Box

ARCHAEOLOGY

What ancient inscription is to be completely copied for the first time? p. 76

What signs of violence have been found in ancient Sinai? p. 78

GENERAL SCIENCE

What election forecasts have been made by a veteran predictor? p. 78

MEDICINE

Against what germs is the new antibiotic effective? p. 69

What new drug may herald the conquest of virus diseases? p. 67

MEDICINE-PHYSICS

What weapon will be used in the new attack on cancer? p. 79

METALLURGY

How will ceramic coatings make more dependable jet and rocket engines? p. 70

METEOROLOGY

How will the spread of radioactive gas be prevented? p. 67

PHYSICS-ASTRONOMY

What is the latest theory on the evolution of the universe? p. 71

Photographs: Cover, U. S Air Force; p. 67, p. 69, Lederle Laboratories; p. 70, Post Office Department; p. 74, National Retail Lumber Dealers Assoc.; p. 75, Ingersoll Steel Div. Borg-Warner Corp.

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MEDICINE

New Potent Antibiotic

Preliminary trials show that it holds promise of conquering diseases which streptomycin and penicillin have not proved effective against.

➤ A GOLDEN-YELLOW DRUG, cousin to streptomycin but promising to conquer diseases which streptomycin and penicillin do not touch, was announced at the New York Academy of Sciences.

The drug is called aureomycin, the "aureo" part of its name coming from the Latin for gold, and the "mycin" showing that it comes from a kind of fungus, like streptomycin.

Aureomycin was discovered by Dr. B. M. Duggar of the Lederle Laboratories division of the American Cyanamid Company. These are the same laboratories that produced the new sulfa drug now being tried in cases of infantile paralysis.

The golden-yellow fungus drug is effective against germs of the staphylococcus family, such as cause eye infections, against some viruses and some germs called rickettsia. Q fever, Rocky Mountain spotted fever and both typhus and scrub typhus are among the diseases caused by rickettsias.

Trials of aureomycin on patients have been made in Boston, Minneapolis, at Columbia University, at Johns Hopkins in Baltimore and Gallinger Municipal Hospital in Washington, D. C.

"Excellent results" in treatment of patients with Rocky Mountain spotted fever have already been obtained with aureomycin, a group of Johns Hopkins medical researchers reported.

The members of the Hopkins group are Drs. Morton S. Bryer, Emanuel B. Schoenbach, Caroline A. Chandler, Eleanor A. Bliss and Perrin H. Long.

This group has also used the new drug to treat patients with urinary tract infections. Again, they report, excellent results were obtained.

"A valuable addition" to other drugs such as penicillin and the sulfas is their summing up of their nine months' experience with it.

Its first public announcement at the New York Academy of Sciences was followed by other enthusiastic reports from the physicians who have been testing it clinically.

Some of the patients treated for eye infections were physicians. These doctor-patients had had recurrent conjunctivitis, commonly known as pink-eye, for many years and had come to believe that no drug was any good for these infections. Aureomycin treatment was given to them by Dr. Alson E. Braley and Dr. Murray Sanders of Columbia University.

"They were emphatically enthusiastic about the drug and thought the cure was even more rapid than with penicillin," the Columbia scientists reported.

Aureomycin was effective in all staphylococcus eye infections, provided it was used over a period of several days, and produced excellent results in influenzal conjunctivitis.

All of a group of 25 patients suffering from another disease, lymphogranuloma venereum, were helped in varying degrees by the drug, Drs. Louis T. Wright, Myra A. Logan, Aaron Prigot and Lyndon M. Hill reported. These patients were treated at Harlem Hospital.

In eight cases of buboes, one form of this usually stubborn disease, all patients showed reduction in the size of the gland after four days of treatment.

"This was an event which in our experience over 24 years with several hundred cases of early lymphogranuloma has never occurred spontaneously in so short a time," the physicians declared.

They believe that the 25 cases represent infections with multiple strains of the virus causing the disease. The activity of aureomycin, therefore, may not be limited to a single strain.

Much of this work is still in the preliminary stage. But trials in Q fever, mixed bacterial eye infections and a virus-caused venereal disease called lymphogranuloma venereum have reached the stage where the drug may soon be released generally for use in such ailments.

Aureomycin and the anti-polio sulfa drug are the two latest weapons that have been made available to doctors in the past decade. They promise to join the other sulfa drugs, penicillin, streptomycin, polymyxin, and chloromycetin in combatting infections.

Aureomycin should not be confused with the new anti-polio drug, Darvisul. It is not an antibiotic but a modified sulfa drug.

Science News Letter, July 31, 1948

CHEMISTRY

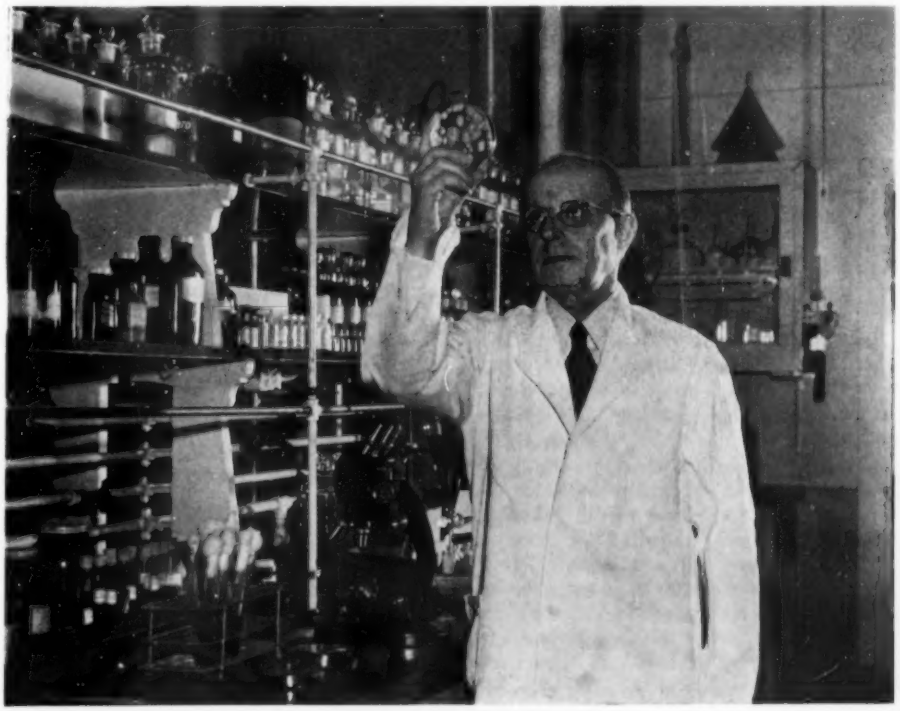
Penicillin Trade Names Becoming too Numerous

➤ "WE NOW OFFER five to one on P. O. B."

It may sound like the latest from the race track, but it comes instead from the editor of the *Journal of the American Medical Association* (July 17).

"P. O. B." is the trade name of a penicillin product. The journal editor, Dr. Morris Fishbein, says it's five to one doctors won't know the nature of the product from that name. Previously he offered, editorially, odds of eight to five that doctors would not guess the nature of a product called "Penioral."

The point of his editorial spoofing is that trade names for penicillin are becoming so numerous and confusing even doctors cannot keep up with them. In protesting a



***AUREOMYCIN DISCOVERER**—Dr. Benjamin M. Duggar, microbiologist at the Pearl River Laboratories of Lederle Laboratories Division, American Cyanamid Co., first isolated the fungus from which was obtained the new golden-colored drug.*

trend to combine the name of the manufacturer with "cillin" he points out that there are almost 30 manufacturers, which offers almost 30 possible names for penicillin.

And here's our tip to anyone wanting to take up the five-to-one offer on P. O. B.: It should pay off on penicillin in oil and beeswax.

Science News Letter, July 31, 1948

METALLURGY

Ceramics in Jet Nozzles

High temperature metals are undergoing investigation in order to develop ceramic coatings which will enable them to resist the high heat of jets and rockets.

➤ MORE dependable ram jet, pulse jet, turbo-jet and rocket engines will result from investigations under way to develop ceramic coatings for high-temperature metals to protect them from the excessive heat in these devices used in high-speed planes, guided missiles and rockets.

The studies are being conducted by the National Bureau of Standards under the sponsorship and with the financial aid of the National Advisory Committee for Aeronautics. The first of them was with ceramic-coated molybdenum, and results now announced indicate that the oxidation of this metal is greatly retarded by some of the coatings tried.

Molybdenum is a logical metal for use in these high-temperature applications because it is available commercially in substantial quantities and it has the extremely high melting point of 4,750 degrees Fahrenheit. In order to use it at high temperatures in the presence of oxygen it must be protected against what otherwise would be a rapid oxidation.

Many high-temperature alloys have been developed during the past few years, but most of them begin to melt within the temperature range of 2,400 to 2,600 degrees Fahrenheit and, while suitable for some applications, are not for others. Of the metals having melting points greatly exceeding this temperature range, only platinum and iridium, melting at 3,180 and 4,260 degrees respectively, withstand oxidation at high temperatures without protection. Their cost, however, is prohibitive.

Other metals that have high melting points, but do not have good oxidation resistance, include titanium, thorium, zirconium, boron, molybdenum, tantalum and tungsten. The last three are of special interest from the standpoint of potential application in very high-temperature service. The first four have high melting points but below that of molybdenum, tantalum and tungsten have higher melting points, 5,160 and 6,100 degrees Fahrenheit respectively.

Preliminary tests have indicated that both tungsten and tantalum may be coated to protect against oxidation; however, the more complete tests have been made on molybdenum, not only because this metal is available in substantial quantities but because there are comparatively large ore deposits in the United States. The coatings, which contain various combinations of such compounds as zirconium oxide, Florida kaolin, calcined kaolin and sodium nitrite, and methods of application to the metal, are described in a recent report of the National Advisory Committee for Aeronautics.

Science News Letter, July 31, 1948

MEDICINE

Neutrons Disappointing In Cancer Treatment

➤ NEUTRONS, the fundamental atomic particles which are so important in fission, have turned out to be less effective in the treatment of cancer than was once hoped.

Rather discouraging results from the only series of cancer patients treated with fast neutrons are reported by Dr. Robert S. Stone, of the University of California Medical School, San Francisco, in the *American Journal of Roentgenology and Radium Therapy* (June).

The radiologist said that the 249 incurable cancer patients in the series were treated after animal experiments showed the neutron beam from the cyclotron was highly destructive of cancer tissue, indicating that neutrons might help cancer victims who otherwise had no hope of survival.

A lack of any appreciable differentiation by neutrons on cancer and healthy tissue is given by Dr. Stone as the reason for the disappointing results.

Neutrons were effective in destroying cancer tissue, but Dr. Stone said that serious damaging after-effects also showed up some time after treatment. These after-effects were more severe than expected, there being no basis in either X-ray therapy or animal experimentation with neutrons to expect such after-effects.

The five-year survival rate of the incurable patients treated with neutrons was 7.5%. If left untreated, the rate would have been somewhat less than 5%.

Eighteen patients were kept alive for more than five years. All of these patients had severe late reactions, some of them so severe that the patients were partially incapacitated.

However, Dr. Stone added that experimental work should be continued to determine if there is some way the cancer-destroying power of neutrons can be eventually applied.

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PALOMAR COMMEMORATIVE STAMP—The central motif is an exterior view of the Palomar Mountain Observatory. It goes on first-day sale at Palomar Mountain, Calif., on Aug. 30. An initial printing order of 50,000,000 stamps has been authorized.

CHEMISTRY

Plastic Containing Rubber Has Unique Qualities

➤ A LIGHT, hard, somewhat brittle resin, to which rubber has been added, has unique properties that make it suitable for use in football helmets, bowling balls and many industrial applications.

The new plastic, called tuf-lite and developed by the Goodyear Tire and Rubber Company, was announced to the American Chemical Society in Los Angeles, by H. R. Thies of the company's chemical division.

The raw materials for the new plastic are butadiene-styrene resins. These are plasticized with synthetic or natural rubber. The final product is at first soft and pliable, flowing readily. It molds cleanly, with little trimming necessary, and handles easily as long as it is kept warm.

The tuf-lite product is one of the toughest of the high-hardness rubbers, or plastics. It has high-impact resistance, low water-absorption, good tensile strength and excellent electrical properties. It is also readily machinable.

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PHYSICS-ASTRONOMY

Creation of Galaxies

It took a tenth of the present age of the universe for the galaxies to evolve into their present general shape, according to latest theory.

➤ WHEN the universe was a tenth as old as it is now, the great masses of stars called the galaxies (like our Milky Way) were formed.

It took that time, 300,000,000 years, from the beginning of things for the universe to evolve into the general shape that it now is.

This new view of the past life of the cosmos has been figured out by Dr. George Gamow, mathematical physicist of the George Washington University, Washington, D. C., author of *"Biography of the Earth"* and other books.

He has figured it out quite literally, for the formulae that he derives to express the size and mass of the galaxies are written in the simple and elemental terms of the properties of the elementary atomic nuclei (hearts of matter).

A few months ago Dr. Gamow joined in fixing the original temperature and density of the expanding universe when it was a few minutes old. In the beginning, all creation was a highly compressed gas made up of neutrons (now best known as the trigger of atomic bomb fission). This gas (heavy as iron) started decaying into protons and electrons and building up the heavier chemical elements. The stuff of the universe was completely made in about one hour.

This probing into the origin of the universe is called by Dr. Gamow "alpha, beta, gamma" stuff because it was done by a team of R. A. Alpher, who got his Ph. D. for it, Dr. H. Bethe, the Cornell physicist famous for the atomic energy theory that keeps the sun stoked, and Dr. Gamow.

Now Dr. Gamow is following the expansion of the universe further. Starting with these initial conditions and the correct proportion of the various kinds of atoms that were "cooked" at the beginning, he finds that the size and mass of the great clouds of stars can be calculated from the initial conditions. And since the universe got into its essentially present shape, nine times as much time has elapsed as was necessary to create the galaxies.

"I am quite excited about these new results on the evolution of the universe," Dr. Gamow told Science Service. "It seems to me to be the best piece of work I have done since the theory of radioactive decay 20 years ago."

Dr. Gamow is lecturing during the summer at Ohio State University. He got the idea for his new researches on the universe while visiting the giant telescopes on Mt. Palomar and Mt. Wilson, and he developed the new theory while riding back east on the Superchief.

In the complex formulae that show the relation between the microcosmos of the atomic nuclei and the macrocosmos of the stellar galaxies, Dr. Gamow uses the elementary charge, the quantum constant, the mass of the proton, the velocity of light, Newton's gravitational constant, and the binding energy of the deuteron. From these he derives the diameter of the stellar galaxies as 12,000 light years and the mass of the galaxies as 15,000,000 times that of the mass of the sun. This corresponds roughly with the dimensions and mass that the astronomers find for some of the galaxies, although the Milky Way in which we live is a giant and considerably larger.

A preliminary communication on his new theory has been sent by Dr. Gamow to the *Physical Review*, journal of the American Physical Society, and a longer account to *Nature* (London).

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The diameter of stellar galaxies:

$$D = \frac{2^{49/8} 5^{1/4} \pi^{7/4} e^2 \hbar^{3/4} \mathcal{E}^{15/4}}{3^{3/8} m^{29/4} c^{35/4} G^{1 5/4}} = 1.1 \cdot 10^{22} \text{ cm} = 12{,}000 \text{ light years}$$

The mass of galaxies:

$$M = \frac{2^{43/8} 5^{7/4} \pi^{5/4} e \hbar^{5/4} \mathcal{E}^{5/4}}{3^{29/8} m^{15/4} c^{5/4} G^{7/4}} = 3 \cdot 10^{40} \text{ g} = 1.5 \cdot 10^{7} \text{ sun masses.}$$

Here:

e – is elementary charge
$\hbar$ – is quantum constant
m – is the mass of proton
c – is the velocity of light
G – is Newtons gravitational constant
$\mathcal{E}$ – is the binding energy of deuteron.

***EVOLUTION OF UNIVERSE FORMULA**—This shows the relation between the microcosmos of atomic nuclei and the macrocosmos of stellar galaxies as worked out by Dr. George Gamow, mathematical physicist of the George Washington University, Washington, D. C.*

ENTOMOLOGY

Red Dye Test Detects Wheat Weevil Infestation

➤ WEEVIL INFESTATION in wheat, long a cause of major grain and flour losses but extremely difficult to detect, can now be shown up very easily by means of a new test devised by J. C. Frankenfeld, U. S. Department of Agriculture entomologist. He simply soaks samples of suspected grain for a few minutes in a dye containing acid fuchsin, a coal-tar product long used in biological laboratories for staining microscope slides. Cherry-red dots appear on grains in which weevil eggs have been laid.

The test depends on the female weevil's method of laying her eggs. She gnaws a hole through the coat of the grain, deposits an egg in it, and seals it up with a plug of jelly-like material, which soon hardens and becomes so much like the grain in color that it is practically impossible to detect.

However, the hardened plug stains vividly red with the fuchsin dye, while the grain fails to take up the color. Thus the weevil's own device is turned against her offspring.

For the protection of the new wheat crop, the Department of Agriculture recommends thorough clean-up of bins and disposal of old grain, coating the walls with residual-type DDT or other persistent insecticide spray before filling, and fumigation of filled bins during August.

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ASTRONOMY

Will Watch Minor Planets So They Won't Get Lost

➤ SAFEGUARDING the 1,500 or so minor planets that revolve around the sun between the orbits of Mars and Jupiter is one of the many problems to be considered at the meeting of the International Astronomical Union in Zurich, Aug. 11 to 18.

Most of these asteroids are so tiny that they can be distinguished from faint stars only by the fact that they move across the heavens. The majority of them are less than 50 miles across. They should be observed at least once every few years, because the paths they follow in space must be continually corrected to keep them from getting lost. Each minor planet will, in effect, be given a "guardian astronomer."

Plans will also be made to improve the study of variable stars. This project was originally assigned to the Germans, and later taken over by Russian astronomers.

About 40 astronomers from the United States are expected to attend the international astronomical meeting, the first general assembly to be held in a decade. Already some representatives from the United States are on their way, others plan to fly over early in August.

Six have been appointed voting delegates to represent the United States. Dr. Otto Struve, director of Yerkes Observatory of the University of Chicago, is chairman of the delegation. Others include: Dr. Dirk Brower, director of the Yale University Observatory; Dr. Hamilton M. Jeffers of the Lick Observatory, University of California; Dr. Edwin P. Hubble, Mount Wilson Observatory of the Carnegie Institution of Washington; Dr. Harlow Shapley, director of Harvard College Observatory; and Dr. Joel Stebbins, director of Washburn Observatory of the University of Wisconsin. Dr. W. S. Adams, director emeritus of Mount Wilson and vice president of the I. A. U., will not attend.

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ENGINEERING

Propose Allocating Costs Of Water Projects

➤ EACH of the various purposes served by water development projects, such as irrigation, flood control, navigation and power, can and should be made to bear their proper share in cost allocation, the American Society of Civil Engineers was told at a meeting in Seattle, by Col. F. W. Scheidenhelm.

The colonel is chairman of a special committee of the society participated in by four divisions of the organization: Irrigation, Power, Waterways and Engineering Economics. The plan of procedure recommended for allocating costs, which often involve millions of dollars of federal funds, is for greater protection to taxpayers through disclosure of all subsidies. It is designed to help standardize the financial analysis of such huge projects as the Hoover, Grand Coulee, and Bonneville dams, and the system of dams of the Tennessee Valley Authority.

The plan proposed is necessarily complicated because of the complexities of the subject, but is based on what is called a "proportionate use of capacity." It distributes joint costs upon the basis of the comparative use of the joint facilities, leaving the way open for possible needed later adjustments.

Under present national law, costs incurred in flood control and navigation are charged almost entirely to the federal treasury and, hence, paid by the federal taxpayers. Costs incurred for irrigation are repayable in part by water users to the treasury, and costs for power development are intended to be repaid to the government in full. For this reason an equitable system of cost allotment is essential.

Science News Letter, July 31, 1948

METEOROLOGY-ENGINEERING

Wave Recorders Benefit Waterfront Structures

➤ WAVE RECORDERS at strategic locations on the Pacific coast will register wave characteristics and the information gained will be of benefit in erecting waterfront structures.

Some of these wave recorders have been in use for over a year, the American Society of Civil Engineers was told at a meeting in Seattle, by Prof. J. W. Johnson of the University of California. Records from the wave recorders also provide a means of checking the method of forecasting waves from weather charts, he stated.

Of the various recorders which have been developed by the University of California, all work on the method of recording pressure fluctuations at the sea bottom and transposing these values to surface wave height. The fundamental principle of the method is that surface waves induce pressure changes in the entire column of water between the surface and the sea bottom. The instrument consists of an underwater unit to pick up and convert pressure fluctuations into electrical impulses which are transmitted by cable to a chart recorder on shore.

The records not only give the wave characteristics which structures must be designed to withstand, he said, but also give knowledge of value in determining whether structures are economically justified in view of the frequency of occurrence of waves of damaging character.

Forecasting unusual waves and their probable heights is important in controlling marine and shore activities. The recorders have already proven themselves a valuable aid in these forecasts.

Science News Letter, July 31, 1948

IN SCIEN

ASTRONOMY

Faint Comet Discovered By California Astronomer

➤ A FAINT COMET has been discovered by C. A. Wirtanen of Lick Observatory of the University of California. Mr. Wirtanen found another faint comet about this time last year, and within the last 11 months has spotted two tiny minor planets.

The new comet is of the fifteenth magnitude and thus so faint you will not be able to see it without the aid of a powerful telescope. Located in the constellation of Equuleus, the colt, it is moving in the direction of the constellation of Aquila, the eagle.

Found on a plate taken the morning of July 15, the comet appears only as a small streak. At that time its right ascension was 21 hours, 13.7 minutes; its declination plus seven degrees, 55 minutes. It is moving slowly west and south, but to date its orbit has not been worked out.

Science News Letter, July 31, 1948

PHYSICS

Einstein Theory No Bar To Space Ship Navigation

➤ SUPPOSE you were in a space ship on the road to Mars. You had no radio connection with earth and your space ship had no windows. The only clue to your position that you could have would be a measurement of the forces acting on your ship. How would you find your way?

The solution to this riddle is demonstrated by John J. Gilvarry of North American Aviation, Inc., Los Angeles, in a report to the journal of the American Physical Society, *The Physical Review* (June 1).

It can be done if you happen to be a competent computer. If you know the pull of gravity at the point where you are, your centrifugal acceleration and the pull exerted on your ship by any rotating systems in the vicinity, you can figure out your position. The formulae used for doing this are the same type used in the instrument designed to fix the fuel cut-off point in the German V-2 rocket.

Einstein's equivalence principle has frequently been interpreted to imply that this riddle could not be solved. Mr. Gilvarry shows that this interpretation is wrong. What Einstein really means is that a pilot who had never been out of his space ship and who had never had a chance to measure gravity without being misled by the motion of the ship would be unable to solve this problem.

Science News Letter, July 31, 1948

NCE FIELDS

GENERAL SCIENCE

U. S. Army Medical Library Sends Books to Europe

➤ MORE THAN a thousand books on medicine to build up war-ravaged libraries of Europe have been distributed from the stocks of the United States Army Medical Library.

Belgium, China, France, Great Britain, Hungary, Poland and Yugoslavia have received this aid from the U. S.

Libraries to receive American books were selected by the United Nations Educational, Scientific and Cultural Organization. The International Clearing House for Publications in Paris, a branch of UNESCO which coordinates the world-wide exchange of literature and directs the dispatch of gift volumes from donor to receiving countries, has handled the distribution of the books.

Thousands of publications are funneled monthly through the UNESCO Clearing House to needy areas. Particular emphasis is placed on war-devastated countries in accordance with UNESCO's Reconstruction Program.

Science News Letter, July 31, 1948

CHEMISTRY

Plastic Wraps for Fruit Are Moisture-Resistant

➤ A NEW plastic wrapper for fruits, vegetables, tobacco and other products, thin as paper and transparent as cellophane, was described in Los Angeles to the American Chemical Society. The chemicals used in the plastic films are made entirely from petroleum, and the films owe their preservative properties moisture resistance.

The chemicals used are known as S-polymers. The films keep moisture in or out. In a test with the new wrapper, S-polymer-wrapped oranges lost only one-tenth their weight in a 28-week period, while unwrapped oranges had shrunk to less than half their original weight in the same period.

The report on the new wrapping material was presented by W. A. Fairclough of the Eniay Company, New York. Co-authors were Raymond G. Newberg and J. R. Briggs of Esso Laboratories, Linden, N. J.

Science News Letter, July 31, 1948

CHEMISTRY

Chemist Gets Award for Work on Guayule Rubber

➤ THE Charles Goodyear medal of the American Chemical Society was awarded to a retired chemist, Dr. David Spence, Pacific Grove, for his work on guayule rubber, the only natural rubber commercially made in the United States.

The medal is a tribute to Charles Goodyear, credited with being the inventor of rubber vulcanizing. The Scotch-born Dr. Spence is honored for his contributions to the growth of the guayule shrub and the production of rubber from it. He is an outstanding authority on rubber chemistry.

Guayule, a native American plant, was one of the most promising sources of domestic natural rubber during the years when the foreign supply was cut off and before satisfactory synthetic rubber was being produced. Extensive plantings of the shrub were made in the Southwest and rubber was made from it. About two years is required to bring a guayule plant to the harvesting stage.

Other proposed sources of home-grown American rubber offered less promise. A Russian dandelion called kok-sagyz was proposed but its rubber yield is much less than that of the guayule shrub. There is rubber in various species of milkweeds, spurges and goldenrods, but the content is low and extraction is difficult.

Science News Letter, July 31, 1948

PHYSIOLOGY

Mammalian Hormone Now Proved Present in Hens

➤ A HORMONE or internal gland secretion known as progesterone, long supposed to be a monopoly of mammals, has now been proved to be present in hens by Dr. Richard Fraps, zoologist of the U. S. Department of Agriculture, who works at the great research center at Beltsville, Md., together with Drs. Charles Hooker and Thomas Forbes, of Yale University. Formal announcement of the discovery was made in *Science* (July 23).

In mammals, progesterone is responsible for the attachment of the first beginnings of the embryo to the maternal tissues that will nourish it and in time bring it to birth. Since nothing of this sort happens in birds, the role of progesterone in this great animal group is not altogether clear.

Dr. Fraps is inclined to think that the hormone may act as a kind of chemical trigger to two other hormones secreted by the pituitary, a small gland just under the brain. The release of these hormones in turn starts the egg on its career of formation and being laid. It may also have something to do with a substance in the egg white known as avidin, which has germicidal properties and thus protects the chick during its three weeks of helpless existence within the shell.

Existence of this supposedly "mammalian" hormone in the hen, and presumably in other birds as well, adds to the evidence that birds and mammals, unlike though they are, have a common ancestry somewhere back alone the line.

Science News Letter, July 31, 1948

ENGINEERING

Rubber in Asphalt Makes Improved Road Surfacing

➤ RUBBER in asphalt is reported to make an improved road surfacing material. A 5% to 10% rubber powder mixture with asphalt gives a surface with longer life, more resistance to wear, and with better anti-skid properties, according to London authorities.

This is indicated in a recent report of the British Rubber Development Board. The conclusions of the board are based on its investigation of experimental stretches of rubber-asphalt roads in the Netherlands. Some of these stretches have now had a 10-year tryout. One, which had been subjected to very hard usage during the war years and on which little maintenance had been carried out, was in first-class condition when compared with adjacent stretches containing no rubber.

A Netherlands organization, together with an associated group in the Netherlands East Indies, carried out prewar research into the effects of the addition of small quantities of rubber on the properties of asphalt. It was found that the addition of from 5% to 10% of rubber powder affected the properties of the material when applied to roads in such a manner that penetration, resistance to impact, softening and lessening flow were particularly improved.

The reason for the improvement, according to the Rubber Development Board, is that the rubber powder slowly absorbs the light constituents of the asphalt, rendering it elastic and reducing its tendency to flow. Heat penetration seems also to be reduced. The rubber-asphalt roads are reported to be less soft in summer and less hard in winter than the asphalt roads without the rubber powder.

Science News Letter, July 31, 1948

BIOCHEMISTRY

Chemical from Fungus Halts Spread of Fungi

➤ A CHEMICAL called trichothecin, which is produced by a fungus itself, has the power to stop the spread of other fungi. It does this by preventing the fungi from reproducing.

Trichothecin has been extracted from the fungus species known as *Trichothecium roseum* by G. G. Freeman and R. I. Morrison of the Imperial Chemical Industries' Research Department in Ayrshire, England. They report their findings in a letter to the journal, *Nature* (July 3).

Full accounts of the chemical and biological properties of trichothecin are being prepared by the scientists. They may show that trichothecin will be a useful weapon in the war against fungus-caused diseases which affect both animals and plants.

Science News Letter, July 31, 1948

ENGINEERING

Saving on New Housing

Many authorities believe that cutting costs depends upon simplication and standardization of parts plus the application of mechanized methods on the job.

By A. C. MONAHAN

➤ IF YOU ARE going to build a small house for your family now in spite of present high costs, there are small savings that can be made which still give a satisfactory building.

Not much can be saved, it is true, but every dollar counts. Real reduction in building costs will come only with fundamental changes in the building industry. These changes will reach deeply into state and municipal building codes, and into practices of architects, supply manufacturers and distributors, contractors and labor. All share a part in the situation that makes houses cost so much at the present time.

The fundamental changes can not be made in a day or year. For that reason many studies have been made to find ways and means of cutting costs with them unchanged by simplified procedures, standardization of materials in quality and dimensions, and use of factory-built parts, and the use of power tools to replace hand methods.

Standard Parts

Among valuable suggestions of immediate application in home-building are those of the U. S. Housing and Home Finance Agency and of the National Retail Lumber Dealers Association. Others of value are issued by the housing division of the University of Illinois and similar institutions in other states. The use of standard parts seems to be a keynote in all.

Standardized parts, as the term is most widely understood in construction, are standard in dimensions. Under the so-called modular system, all measurements are based on four-inch multiples. Since many coordinated products, such as panel, windows and doors, are now available, houses may be designed with standard parts that need little if any cutting and fitting. This means a real saving in labor costs.

The suggestions of the National Retail Lumber Dealers Association for small houses include:

Modular design coordinating materials using a four-inch multiple.

Adoption of a four-foot planning multiple for lengths, width and height of rooms and interiors.

Use of 16-foot unsupported spans where possible.

Application of finished floor and ceiling material, where feasible, before erection of interior partitions.

Use of pre-cut and pre-assembled materials, particularly in closets and storage walls, partitions, and roof trusses, where practicable.

Use of plumbing wall or shortest plumbing and heating lines possible with proper functioning.

Use of basic home designs subject to easy changes of appearance through positioning on the lot, minor additions, and decorative treatment.

To illustrate the principles recommended by the National Retail Lumber Dealers Association, the organization designed plans for a standard housing unit. It is a one-story affair, 16 feet wide and 24 or 28 feet long. Two units can be used if desired, either in L-shape, or one over the other to give a two-story house.

Model House

The 16-foot width for this model house was selected because it is the greatest space that can be safely spanned by two-by-ten-inch floor joists supported only at the two ends. This width also permits the use of a very simple tied-rafter type of roof truss, readily assembled on the floor and easily lifted into place by two men.

The 24- or 28-foot length was selected because they are convenient multiples of standard 4-foot factory-built wallboard and outside covering. These lengths also permit equal spacing of joists and studs placed either 16 or 24 inches from center to center.

The inside partitions in this house are not erected until the finished floor is down and the ceiling completed. They bear no weight but their own. Laying the top flooring before the partitions are erected means real economy in labor by saving time usually taken in cutting floor boards to fit to partitions and the doors in them. Further economy is secured in this house by placing the bathroom adjacent to the kitchen, so that all plumbing is in one wall.

Houses for Veterans

The U. S. Housing and Home Finance Agency has been particularly concerned with low-cost houses for veterans and has prepared bulletins with valuable suggestions. For young couples without family, it recommends an expansible house. This is a building so designed that additions may be made later at the least cost and without destroying its beauty.

One of its original houses is a rectangular affair with kitchen, living room, one bedroom, bath and alcove. It can be lengthened, or enlarged with wings. Converting a window or two into inside doors, and roof attachments, are about all the changes necessary in the original structure when the additions are made.

Other publications of this government office cover such subjects as lower costs through better codes, insulation of concrete floors, earth constructions and planning the house. A particularly interesting suggestion is the use of wood roof trusses for small dwellings.

Definite savings in materials and labor requirements through use of preassembled

L-SHAPED HOUSE—It is made of two standard units suggested by the National Retail Lumber Dealers Association.

UTILITY UNIT—A factory-built Ingersoll utility unit core has furnace, hot water heater, and plumbing to which kitchen, laundry and bathroom fixtures, a part of the unit, are attached.

wood roof trusses make truss framing an effective means of cost reduction in small dwelling construction, the agency states. In a 26-by-32 house, the use of trusses can result in a cost saving of approximately $70.00, and a reduction in use of lumber of almost 30% as compared to conventional rafter and joist construction.

With pre-assembled trusses a roof can be put over the job quickly to provide protection against the weather, and also they permit the use of non-bearing partitions giving flexibility in interior arrangements.

The construction industry as a whole is big business but in operation it is made up of widely separated individual small activities. House construction is a local industry; few contractors of dwelling units operate anywhere but in their local areas.

So long as the single house, separately planned and constructed one or a few at a time, remains the unit of production in the building industry, little cut in costs may be expected. This is particularly true as long as builders are called upon to cut, fit and assemble the numerous parts of a house on the site and by separate workers of various trades.

Those who have studied the present situation seem to believe that progress depends primarily upon simplification and standardization of parts, the use of factory-built sub-assemblies, and the greater use of machine tools and mechanized methods on the job.

Municipal building codes are blamed by many, including the U. S. Housing and Home Finance Agency, for much of the unnecessary high costs of present housing. These codes, almost every city has one, are based on old-time construction practices and old-time materials. They fail to take into consideration newer building materials thinner and lighter in weight that have equal strength with old materials. Many of them prohibit the erection of factory-built complete houses, the so-called pre-fabricated type, because they lack the required wall thickness.

In studies of the high cost of building, many find labor partly to blame. There are restrictive actions on the part of labor organizations which result in increased cost. These include labor agreements which require that certain kinds of work belong to certain labor unions, and no others may touch. The result is the employment of more craftsmen and foremen than otherwise would be employed.

Then there are labor restrictions that discourage or prevent the erection of pre-fabricated houses or parts that would lessen hand work on the job. Also there are regulations relative to the number of bricks a workman may lay in a day, the width of the paint brush he may use, and the number of apprentices that may be trained.

Labor alone is not to blame for present high costs, however. Government regulations, manufacturers and distributors of materials, and contractors all must share blame. The elimination of restrictive practices that reduce genuine competition among supply dealers and contractors is one step suggested to help greatly in cutting the cost of home-building.

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SCIENCE SERVICE
Washington 6, D. C.

Do You Know?

Australian football and Irish football are somewhat alike, but the Australian game is played with an oval ball on an oval field and the Irish game with a round ball on a square field.

Ocean ice is classed as field ice, growlers and icebergs; the first is pack ice of shallow draft, the second are low-lying pieces of glacier ice not as large as bergs, and icebergs are large floating masses four-fifths under water.

One characteristic of *birds* is the dominance of vision over other senses.

The so-called *barking frog* found in Texas has a remarkable call that somewhat resembles the barking of a dog.

Air within a tube, if reduced to a very low pressure, can be made to glow by passing a high-voltage electrical discharge through it.

Cuba, Illinois-size, has some 80 species and 16 varieties of *palms*.

Sulfur is one of the four principal basic raw materials in chemical manufacture.

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GENERAL SCIENCE

Await Foundation Bill

➤ NOW THAT Congress has reconvened, scientists, educators and military leaders are hoping that the nation can at last have a strong civilian peacetime organization for directing federal support of science—a National Science Foundation.

Rep. Charles A. Wolverton, Rep., N. J., told Science Service that he, too, hopes Congress can now complete action on a bill establishing the Foundation. Rep. Wolverton, chairman of the House Committee on Interstate and Foreign Commerce, introduced a science foundation bill at the same time that an identical one was put in the Senate hopper by Sen. H. Alexander Smith, Rep., N. J., for a bi-partisan group of senators. The Senate passed by voice vote a slightly amended bill early in May. But the House version came out of committee late in the session and failed to get unanimous consent. When Congress adjourned, the bill had not come up for debate on the floor of the House yet.

Now, its supporters, including the Inter-Society Committee for a National Science Foundation which represents many scientific and educational groups, will be pushing for action on the bill which needs only action by the Rules Committee to bring it to the floor of the House.

President Truman's recall of Congress gives another breath of life to the long-awaited Foundation. Envisioned originally by Dr. Vannevar Bush as a peacetime successor to the Office of Scientific Research and Development which he headed in World War II, the Foundation has had a hectic legislative history. It has been discussed by witnesses at Congressional hearings since the war ended. A bill passed the Senate in the seventy-ninth Congress, and both houses a year ago when President Truman killed it by a pocket veto.

The present bills—the one which passed the Senate and the one which is before the House—differ only in detail. Both are believed to be satisfactory to the Administration. In fact, no one seems to oppose actively the Foundation. But this has been generally true for some time and there is still no Foundation.

If the House passes the bill, it will probably be sent into a conference to iron out differences in the two pieces of legislation. Then, the bill would go to the White House.

A National Science Foundation would probably be cheered in many quarters. In addition to the scientists, who have favored such legislation all along, the military would heave a sigh of relief. The Armed Forces have been carrying much of the burden of government support to science since the war.

Science News Letter, July 31, 1948

ARCHAEOLOGY

Copy Asiatic Inscription

➤ THE first complete copy of an ancient inscription carved more than 2,400 years ago on the walls of Mount Behistun in Iran will be made by a group of American archaeologists this summer.

This inscription is called "The Rosetta Stone of Western Asia" after the original "Rosetta Stone" found on the Nile which held the key to Egyptian hieroglyphics. The inscription on Mount Behistun has shown scholars how to translate ancient cuneiform writing.

The expedition is sponsored by the University of Michigan and the American Schools of Oriental Research and is under the direction of Prof. George G. Cameron of the Oriental Institute of the University of Chicago.

The inscription the expedition will study is one of the most famous in Western Asia. Cut into the rocks by the order of Darius, King of Persia, it contains a relief showing Darius and 10 of his enemies whom he subdued. Underneath the relief are eight columns of cuneiform writing, telling how Darius outwitted his enemies, and, with the aid of his god Auramazda, became king over Persia. This, it is explained, was because he was "neither a liar nor an evildoer, neither I nor any of my family."

The story is told in three languages which were current 2,500 years ago. These are: Elamite, which is mentioned in the Biblical book of Esther; old Persian, Darius' own tongue; and Babylonian. By comparing these different versions of the same story, modern scholars have found the key to cuneiform.

The expedition plans to re-examine all the doubtful passages in these inscriptions and also to study four additional columns of inscriptions which have never been read because they are inaccessible from the ground. In order to reach these columns the archaeologists will lower a scaffolding from a natural shelf, 300 feet above the inscriptions.

To copy and photograph the main part of the inscription which is carved 500 feet above a plain, the expedition will use standard mountain-climbing equipment and a skyscraper scaffolding.

The members of the expedition are leaving for Iran at the end of July. They hope to complete their work and return to this country in the early part of next year.

Science News Letter, July 31, 1948

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A mineral that makes you see double; a printed circuit; materials with which to assemble a dry cell—these are the exciting objects contained in the MINERAL OPTICS, ELECTRONIC and DRY CELL UNITS making up this collection. Among the 20 specimens contained in this group are a subminiature tube, light sensitive cell, iceland spar and labradorite. A factory-assembled dry cell and the materials needed to make one at home—zinc can, wrapped bobbin, bottom washer, top collar, sealing compound and label—are included along with a tiny flashlight bulb, litmus paper, wire, iron rod and filings with which to perform experiments.

B COLOR COLLECTION

Paints that glow in the dark; red and green plastic sheets that together cut out all light; brilliant dyes obtained from plant roots —these and many other intriguing specimens are contained in the PHOSPHORESCENCE, PLASTIC PILOT AIDS and VEGETABLE DYES UNITS which make this colorful collection. There are fourteen specimens in all, including blind flying sheeting in red and green, dimout blue sheeting, ultra violet transmitting sheeting, phosphorescence plastic, tape, pigment, paint, madder, indigo, tumeric and alum.

C MINERAL COLLECTION

Stones showing the original structure of trees that grew millions of years ago; vacuum tube insulator made from one of the softest known minerals; rock containing traces of native sulfur—these are the surprising subjects in the PETRIFIED WOOD, TALC and SULFUR UNITS making up this collection. In the three boxes there are seventeen specimens, including petrified sweetgum, redwood, oak, elm and bog, fired and natural talc, sulfur-bearing limestone, iron sulfide, zinc sulfide, crude sulfur and flowers of sulfur.

D UNUSUAL MATERIALS COLLECTION

Porous cushioning material for upholstery; glass-enclosed air cells used to keep out heat or cold; zinc made fine-grained by incorporation of only 0.05% lithium—these materials of industrial importance are contained in the HOUSING, HOME AND OFFICE and LITHIUM UNITS. The eighteen specimens contained in these three blue boxes include wood-fiber wallboard, plywood, glass fiber fabric, coffee measure, airfoam, plastic and wire screening, shaver head, natural spodumine, lithium chloride, lithium nitride, pure zinc, zinc and lithium master alloy, and lithium-treated zinc.

E FIBER COLLECTION

Synthetic fiber made from skim milk; twisted rayon cord used in auto tires; glass fibers less than three ten-thousandths of an inch in diameter—these are the interesting subjects of the CASEIN, RAYON and GLASS FIBER UNITS that will be sent to those selecting this collection. In the three boxes that make up this series of exhibits there are fifteen specimens, including casein powder, raw fiber spun from casein, aralac, soft glass fiber, cotton linters, chemical cotton pulp, rayon tire cord and rayon fabric lining material.

F PLASTIC COLLECTION

Film with a seam that is stronger than the plastic itself; plastic plate with which you can print a bit of illustration or writing; plastic-coated yarn for crocheting or braiding a design—these are the rewarding specimens contained in VINYL PLASTIC FILM, PLASTICS IN PRINTING and PLASTIC COATED YARN UNITS which comprise this unusual scientific collection. There are 20 specimens, including vinyl plastic film, heat sealed seam, spot welded ruffle, plasting printing plate, moisture-proof sheeting, twist leaflet binding, plastic-coated yarn, flame-retardant webbing and fine fabric.

G TEXTILE COLLECTION

Raw material from which you can make a length of synthetic fiber; complete boll of fluffy white cotton; dye that enables you to identify different types of textiles—you have examples of both natural and synthetic fibers and a means of identifying them in the VINYL RESIN FIBER, COTTON and TEXTILE IDENTIFICATION UNITS. Twenty-two specimens make up this varied display, including vinyl resin, unstretched vinyl resin yarn, filter cloth, sailcloth, waterproof felt, tea bag, cotton boll, cotton that is tinted brown and green by nature, a differential dye and several swatches of different types of fabric to show how to distinguish cotton from silk, rayon and wool.

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GENERAL SCIENCE

Election Forecast Made

A Republican President with a Democratic Congress is seen as a possibility. Wallace's third party not likely to be determining factor, veteran predictor says.

➤ THAT the elections this fall may very possibly give us a Republican President and a Democratic Congress is the suggestion made by a veteran predictor of elections, Louis H. Bean, economic adviser to the Secretary of Agriculture, in a new book, *"How to Predict Elections"* (Knopf).

There is, Mr. Bean has found from a study of votes for Congress and for President during the past hundred years, a regular tide of ups and downs in party popularity. If the political tide follows the same course that it has in previous years, the 1948 elections may very well mark an upward swing for the Democratic Party from the low of the 1946 Congressional elections, when the Democrats actually lost more votes than they might have been expected to on the basis of past history.

Wallace's new third party is not likely to be a determining factor in the coming election, it would seem from Mr. Bean's figures. A third party is seldom strong enough in the first year after its organization to draw as much as a fourth or a fifth of the total vote.

Theodore Roosevelt's Progressive Party was the strongest vote-getter on record, but it polled only 27.4% of the total vote. Although he is generally credited with taking enough Republican votes away from the fold to elect Wilson, Mr. Bean's figures indicate that this is giving too much credit to the Bull Moosers.

"In 1912," says Mr. Bean, "the political tide was running strongly liberal, progressive and Democratic and, in spite of the general belief, it appears that the Democrats had sufficient strength to elect Wilson had there been no third party."

The case was similar in 1924 when La Follette was taking votes away from the Democrats.

"In 1924 the political tide was running so strongly Republican that the Republicans would have won even if La Follette had not diverted nearly 5,000,000 votes from the Democrats."

No prediction is made by Mr. Bean (publicly, at least) as to how many votes will be carried off by Mr. Wallace or what the actual election result will be. But he does give a hint of where the third party strength may be expected. Some states, he has observed, have a political flexibility; others lack it. Even when the nation's vote changes as much as 10 points one way or the other, New Hampshire would change only 4 points. North Dakota, on the other hand, shifted 19 points. Wallace can look for his strength in the Northwestern states having the greatest political flexibility, and least in the relatively stable states.

The carrying of certain states, with their important electoral votes, has a certain relation to the strength of the popular vote, Mr. Bean has found. This is the order in which states may be expected to join the Democratic ranks if the popular vote should climb above 50%.

At 51%, Idaho. At 52%, Washington, Ohio, Delaware and Colorado. At 53%, Wyoming, Wisconsin, North Dakota, Nebraska and California. If these latter are all won, victory for the Democrats would be sure.

"If the Democrats made sure of Ohio and California," Mr. Bean predicts, "they might barely win. But if they reach into the 54% level and take New Jersey or New York, victory would be more certain."

Science News Letter, July 31, 1948

ARCHAEOLOGY

Violence in Ancient Sinai

➤ BLOODSHED in the tension-zone between the Holy Land and Egypt is no new thing under the sun. Ages before the present fighting, even before the Children of Israel saw the pursuing chariots of Pharaoh overwhelmed, there were red stains on the sands of Sinai.

Evidences of battle and sudden death a hundred thousand years ago, at er-Rawafi in Sinai, near the boundary of Palestine, were described by Dr. Henry Field, newly returned from field work with the University of California African Expedition. Dr. Field spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, heard over stations of the Columbia Broadcasting System.

On the sides of a low hill in the desert, members of the expedition found large numbers of primitive hand-axes made of a yellowish-white stone, "in almost mint condition." They were of the type known as Mousterian, which were used by early Old Stone Age men, of the Neandertal level of development.

"As we reconstructed it," Dr. Field related, "the prehistoric flint-knapper and his friends must have been killed by a sudden attack or were driven from this sheltered spot overlooking some water pools, never to return. . . Hand-to-hand conflict in this part of the world is obviously not merely of our time."

The expedition crossed the Wilderness of Zin, through which Moses led the Israelites after they had escaped from Egyptian bondage. They saw very few signs of life, either ancient or modern, and hardly any animals, until suddenly they saw a ship—they had arrived at the Suez Canal.

"How the Israelites or anyone else could survive for long in that desert remains a mystery," commented Dr. Field.

Researches on the geography of Sinai convinced members of the expedition that the hosts of Pharaoh pursuing the Children of Israel met their end not in the Red Sea but in a great swamp called the Sea of Reeds.

As Dr. Fields reconstructed the event: "Moses and the Israelites were held as slaves at Rameses, later Tanis. Moses felt the approach of a great storm. That evening he led the Israelites eastward across the Sea of Reeds, later called the Reed Sea, and then misinterpreted as the Red Sea in our Bible.

"The Egyptians followed, with their heavy chariots, which became mired. They removed the wheels as described in Exodus, but that did not help. Then the storm broke over the Sea of Reeds. Moses and the Israelites had crossed to dry land. They had escaped. The miracle was complete."

Science News Letter, July 31, 1948

METEOROLOGY

20-Year Period Shows Cut In Hurricane Life Loss

➤ LOSS OF LIFE in hurricanes in this country has been cut to one-fortieth of its former magnitude in the past 20 years, thanks to better warning services and preparedness against disaster, states Howard C. Sumner of the U. S. Weather Bureau.

Mr. Sumner's figures are not absolute, but are measured by the amount of property damage. Much of the property exposed to hurricane damage, such as docks, warehouses, bridges, field crops and orchards, cannot be moved out of harm's way; but human beings can get to high ground and other secure places if they are told far enough in advance what is coming. Thus it has come to pass that for every ten million dollars' worth of storm-ruined property in the five-year period 1941-45 only four persons lost their lives, whereas in the 1926-30 period the comparable figure was 161.

The Weather Bureau does not claim all the credit for this improvement, it is emphasized. Red Cross disaster relief, Army and Navy air reconnaissance, both professional and "ham" radio stations, the press, telephone and telegraph companies, and alert private citizens have all contributed towards the vast improvement in the life-saving record.

Science News Letter, July 31, 1948

Books of the Week

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ANGORA RABBIT WOOL PRODUCTION—Thora M. Plitt Hardy and Ethel H. Dolnick—*Govt. Printing Office*, 22 p., illus., paper, 10 cents. Reports of investigations at Beltsville.

BASIC FISH COOKERY—Rose G. Kerr—*Fish and Wildlife Service*, 26 p., illus., free upon request to the Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C. Clear photographs show how to clean and prepare fish in appetizing ways that will probably be new to you.

CHEMISTRY: A History of the Chemistry Components of the National Defense Research Committee, 1940-1946—W. A. Noyes, Jr., Ed.—*Little-Brown*, 524 p., illus., $6.00. The story of chemistry in the war includes the dramatic chapter of explosives, gas warfare, the more soothing story of insecticides and repellents, flame throwers, antifouling paints and mold prevention.

DIRECTORY OF ACTIVITIES OF THE BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, 1947—*Govt. Printing Office*, 157 p., paper, 30 cents. A very interesting summary of all the researches now under way with a list of the personnel engaged in them.

EATING FOR HEALTH—Pearl Lewis—*Macmillan*, 119 p., illus., $2.25. A practical book for use in meal planning and preparation.

ELEMENTARY INDUSTRIAL ELECTRONICS—William R. Wellman—*Van Nostrand*, 371 p., illus., $3.20. A book for students and workers in the electrical and plant maintenance fields.

ESSENTIALS OF PUBLIC HEALTH—William P. Shepard, Charles Edward Smith, Rodney Rau Beard, and Leon Benedict Reynolds—*Lippincott*, 600 p., illus., $5.00. A condensed handbook for the physician in private practice or the medical student.

THE FIRST 25 YEARS OF THE NAVAL RESEARCH LABORATORY—A. Hoyt Taylor—*Navy Department*, 75 p., illus., paper, limited number free upon request to the U. S. Naval Research Laboratory, Washington 25, D. C. The story of the birthplace of many modern instruments of war.

INFLUENCE OF PARTICLE SIZE IN DUST EXPOSURE—Theodore Hatch and W. C. L. Hemeon—*Industrial Hygiene Foundation*, 8 p., paper, free upon request to the Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh 13, Pa.

LIFE HISTORIES OF NORTH AMERICAN NUTHATCHES, WRENS, THRASHERS AND THEIR ALLIES—*Arthur Cleveland Bent—Govt. Printing Office*, 475 p., illus., paper, $1.75. The sixteenth in a series of the life history of North American birds prepared by the United States National Museum.

MINING GEOLOGY—Hugh Exton McKinstry and others—*Prentice-Hall*, 680 p., illus., $10.00. Gathering together from its scattered sources in human minds and the literature much of the lore, the "art" or the common knowledge of the profession.

SIERRA POPOLUCA SPEECH—Mary L. Foster and George M. Foster—*Govt. Printing Office*, 45 p., paper, 40 cents. A project of the Interdepartmental Committee on Scientific and Cultural Cooperation. Describing the language of four small groups of Indians of Mexico.

UNDERSTANDING SCIENCE—William H. Crouse—*McGraw-Hill*, 190 p., illus., $2.20. Important modern developments explained for high-school students and the general reader.

X-RAY DIFFRACTION ANALYSIS OF CRYSTALLINE DUSTS—Harold P. Klug, Leroy Alexander and Elizabeth Kummer—*Industrial Hygiene Foundation*, 6 p., paper, free upon request to the Mellon Institute of Industrial Research. University of Pittsburgh, Pittsburgh 13, Pa.

Science News Letter, July 31, 1948

MEDICINE-PHYSICS

Ultrasonics Fight Cancer

➤ DISINTEGRATING BEAMS of high frequency sound waves will be focussed on deadly cancer cells in a new attack on this dread disease.

University of Washington scientists, physicists, electrical engineers, physiologists, and pathologists will join in a combined effort under Dr. Loren D. Carlson, assistant dean of the School of Medicine, in conducting the investigation of this method of fighting cancer. This research has been made possible by funds from a $25,000 grant by the Damon Runyon Memorial for cancer research.

Ultrasonic rays of high frequency sound waves whose wavelength is too short to be heard by human ears are expected to be superior to X-rays in treating cancer in that they can be focussed on a small point and do not spread over a larger area, attacking harmless cells.

Ultrasonic apparatus can launch an attack on cancer cells on three fronts. Cells will die from the heat caused by the friction of the rays passing through them. Chemical reactions within the cells may be speeded up by the rays and cause the cells to destroy themselves. Cancer cells, it is expected, will also be destroyed by ray-induced cavitation in which bubbles form in the cells and kill them.

Six years ago the possibility of killing cancer cells with ultrasonic sound waves was investigated by Drs. John C. Krantz, Jr., and Francis F. Beck at the University of Maryland. This research was held back by the fact that not until three years later was a method found of focussing the ultrasonic rays so that they would not harm normal tissue.

Captured German documents indicate that the Germans were starting cancer research along ultrasonic lines before V-E day. The Soviet and Japanese scientists have also published some reports of similar studies.

Ultrasonic apparatus is now being constructed on the campus of the University of Washington, with war surplus radar and sonar equipment. Sonar equipment, used during the war to detect submarines, employs ultrasonic waves which will echo from the sides of water-submerged vessels. The cancer-fighting apparatus is expected to have greater frequency ranges than any other in the nation.

Dr. Carlson said that the equipment will also be used to study the effects of ultrasonics on the central nervous system and in experiments in biology and physics.

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AERONAUTICS

Jets To Conduct Maneuvers Over Continental Europe

See Front Cover

➤ SIXTY-TWO U. S. Air Force jet fighting planes, which are to conduct maneuvers over central Europe, are shown on the cover of this week's SCIENCE NEWS LETTER in a practice flight in formation over the Caribbean Sea before being shipped by aircraft carrier to Scotland.

They are the famous fast Lockheed Shooting Stars, F-80Bs in military parlance. They are manned by the Air Force 36th Fighter Wing, which before departure was located in the Panama Canal Zone. The picture shows what is probably the largest group of jet fighters ever photographed.

Science News Letter, July 31, 1948

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TOOTHPASTE DISPENSER, usable for other materials that come in flexible tubes, is a plastic box with a hinged cover and a threaded hole in one end. When the cap of the toothpaste tube is removed, the tube outlet is screwed into the hole; pressure on the tube ejects the paste through the opening.

Science News Letter, July 31, 1948

NIGHT-GLOWING push bar for doorbells is composed of a luminescent pigment molded into a plastic bar where rain or fingers can not remove it. The bar, set in a solid brass body variously finished, absorbs light during the day and gives it off for hours after dark.

Science News Letter, July 31, 1948

TELEPHONE AID for busy offices is a small cabinet that sits on a desk in which both ends of the ordinary telephone handset rest at all times. When the telephone rings, it remains untouched, but a switch on the cabinet is thrown and conversation is carried on in ordinary tones while the user sits in his usual position.

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SUN-GLASS LENSES that permit the wearer to look straight at the sun without discomfort or at ground-level objects without obscured vision, are coated with a nickel-chromium-iron alloy applied by an evaporation process. The coating, which varies from very light at the bottom to heavier at the top, makes mirrors of the lenses, as shown in the picture, when viewed from the front.

Science News Letter, July 31, 1948

FREQUENCY COUNTER for radio waves is a device which provides a simple means of measuring frequencies from zero to 1.6 megacycles, with accuracies claimed to be one part in 10 million or greater. The basic units of the instrument are two electronic counters, a crystal oscillator and an electronic switch.

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FLASHLIGHT CASE, which glows in the dark, is easily found by the sleeper suddenly awakened during the night. The flashlight itself is similar to familiar types, but its ivory-colored case has a phosphorescent material baked onto the solid drawn-brass housing.

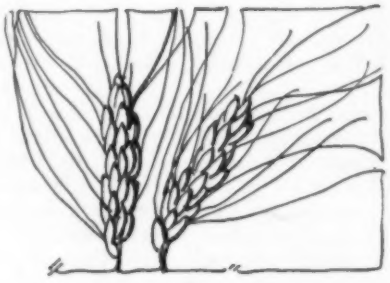
Science News Letter, July 31, 1948

FLUORESCENT PICTURES, on the walls of at least one night club and one suburban home, are invisible as pictures in ordinary light but show brightly when flooded with invisible ultraviolet radiation, much of which they convert to visible light to illuminate the room.

Science News Letter, July 31, 1948

• Nature Ramblings *by Frank Thone* •

Cain and Abel



► ACCORDING to the fifth chapter of the Book of Genesis, Cain slew his younger brother Abel because Abel's sacrifice of a lamb had proved acceptable whereas his own had been rejected. That would make this primal murder a purely personal matter between the two men, and over a religious jealousy at that.

Back of the rather curt Biblical account, however, there is a deeper symbolism. If the quarrel between the brothers did not actually start with a dispute over their respective land-use rights it would be strange, for Cain was a tiller of the soil and Abel was a shepherd. And between followers of those two ways of life there has always been tension and bickering, and sometimes bloody war.

We have seen it in our own country, when farmers began to buy and fence off rangelands in the West, to the fierce resentment of stockmen who had long pastured their animals on free grass. There was much snarling and some shooting before the matter was settled. This quarrel left one curious monument in a word: "sodbuster" became the plainsman's term of contempt for a farmer, and by transfer became also the old Regular Army man's epithet for any civilian.

Back through the ages this contest between the settled farmer and the nomadic herdsman seems to have gone on in all lands. The farmer pushed his cultivation as far as the land would reward him; the herdsman found fenced fields and irrigation ditches very much in his way. Earliest overthrows of ancient civilizations in Mesopotamia seem to have been, at base, great raids by upland, stockraising nomads against lowland husbandmen who practiced intensive agriculture and thereby amassed coveted wealth. Then the raiders settled on the conquered acres, becoming farmers themselves—and eventually victims of the next incursion of still-nomadic warrior-herdsmen.

Eventually in some lands a balance was reached, with the better fields tilled and the stonier uplands used for grazing. That is the picture we get of Palestine in later Bible times: sheep and cattle were prized, but so were grain-fields, vineyards and olive groves. Parables of the shepherd and of the sower and reaper were alike "understanded of the people."

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